UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,675	08/08/2006	Makoto Nunoya	MM9339PCT(US)	9231

22203 7590 03/03/2009

KUSNER & JAFFE
HIGHLAND PLACE SUITE 310
6151 WILSON MILLS ROAD
HIGHLAND HEIGHTS, OH 44143

EXAMINER	
HERNANDEZ, MANUEL J	
ART UNIT	PAPER NUMBER
4154	
MAIL DATE	DELIVERY MODE
03/03/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/588,675	NUNOYA ET AL.	
	Examiner	Art Unit	
	MANUEL HERNANDEZ	4154	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/8/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 August 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/8/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *JPO Computer Translation of JP11-206043*.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: NON-CONTACT POWER SUPPLY SYSTEM UTILIZING SYNCHRONIZED COMMAND SIGNALS TO CONTROL AND CORRECT PHASE DIFFERENCES AMONGST POWER SUPPLY UNITS

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Figure 4, reference number 63. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to because the unlabeled rectangular boxes shown in the drawings should be provided with descriptive text labels. Figure 1 is missing descriptive text labels for items 5, R, 3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

In addition to Replacement Sheets containing the corrected drawing figure(s), applicant is required to submit a marked-up copy of each Replacement Sheet including annotations indicating the changes made to the previous version. The marked-up copy must be clearly labeled as "Annotated Sheets" and must be presented in the amendment or remarks section that explains the change(s) to the drawings. See 37

CFR 1.121(d)(1). Failure to timely submit the proposed drawing and marked-up copy will result in the abandonment of the application.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 4, 7 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 4 and 8, the term “frequency” in these claims is indefinite and does not contain an exact relation to the claimed elements. It is unclear whether the reference “frequency” refers to the received command signal, the backup command signal, or a separate signal, rendering the claim indefinite.

6. Claim 7 recites the limitation "the power supply unit" in line 13. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 7, a plurality of power supply units are initially introduced (lines 4-5), and the claim further describes a single power supply unit (line 13, 15) as having a command signal, which creates ambiguity. It is unclear whether the recited “power supply unit” references each of the power supply units, a specific power supply unit, or a plurality of power supply units, rendering the claim indefinite.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishino et al (US 5,709,291) in view of Hayashi et al (US Pub. No. 2002/0024828).

Regarding claim 1, Nishino et al discloses a non-contact power supply system (Abstract, Title) comprising: a moving body (Figure 12, 71)); a plurality of induction lines arranged sequentially along a moving path (Figure 12, 78, M, Figure 1, M, 14) of the moving body and adjusted to an equal impedance at a predetermined frequency (column 5, lines 26-32); and a plurality of power supply units (Figure 12, 78, M) respectively transforming direct current to alternating current of the predetermined frequency by means of a plurality of switching devices (Figure 4, 51, 52) each driven by a rectangular wave signal (Figure 4, M), and feeding the transformed current as output current to the induction lines (Figure 4, 14, column 4, lines 9-21), the moving body including a pickup coil (Figure 4, 16) facing the induction lines (Figure 4, 14), the moving

body having a load varying in power consumption (column 7, lines 13-14), the load being fed with power from electromotive force induced to the pickup coil (column 1, lines 65-67), wherein the power supply units each has a command signal of the predetermined frequency to drive the switching devices (Figure 4, 51, 52, signal shown between 51 and 52, column 4, 15-18).

Nishino et al fails to disclose measuring and calculation units to determine phase differences and the utilization of the phase difference to advance or delay the rectangular wave signal in response to the command signal.

Hayashi et al teaches the power supply units each includes a measuring unit for measuring power consumption (¶ 0009, lines 7-8) and output current (Figure 1, 64) fed to the induction lines and a calculation unit for determining a phase difference between the output current fed to the induction lines and the rectangular wave signal based on the output current and power consumption measured by the measuring unit (¶ 0009, lines), and the power supply units each advances or delays the rectangular wave signal in response to the command signal according to the phase difference determined by the calculation unit, thereby to drive the switching devices (¶ 0009, lines 10-16).

It would have been obvious to a person having ordinary skill in the art to modify the non-contact power supply of Nishino et al to include the phase regulator of Hayashi et al. One would have been motivated to include the phase regulator to have to avoid cross current from flowing from one power supply to the other and therefore prevent breakage of circuit components (¶ 0004, lines 3-6, ¶ 0008).

Regarding claim 7, Nishino et al discloses a non-contact power supply system (Abstract, Title) in which a plurality of induction lines adjusted to the same impedance at a predetermined frequency (column 5, lines 26-32) are sequentially placed along a moving path (Figure 12, 78, M, Figure 1, M, 14) of a moving body, the system comprising power supply units (Figure 12, 78, M) each transforming direct current to alternating current of the predetermined frequency by means of a plurality of switching devices (Figure 4, 51, 52) driven by a rectangular wave signal (Figure 4, M) and feeding the current as output current to the induction lines (Figure 4, 14, column 4, lines 9-21), the moving body including a pickup coil (Figure 4, 16) facing the induction lines (Figure 4, 14), the moving body having a load of varying power consumption (column 7, lines 13-14), the load being fed with power from electromotive force induced to the pickup coil (column 1, lines 65-67), wherein the power supply unit has a command signal of the predetermined frequency to drive the switching devices (Figure 4, 51, 52, signal shown between 51 and 52, column 4, 15-18),

Nishino et al fails to disclose a power consumption measuring unit and a storage unit used to advance or delay the rectangular wave signal in response to the command signal.

Hayashi et al discloses the power supply unit includes: a measuring unit for measuring power consumption (¶ 0009, lines 7-8) of the induction lines having been fed with the output current (Figure 1, 64), and a storage unit for storing beforehand a phase difference between the rectangular signal and the output current fed to the induction lines at each power consumption of the induction lines (claim 8, lines 2-4), and the

power supply unit searches (claim 8, lines 16-17) the storage unit according to the power consumption (¶ 0065, 0066) measured by the measuring unit to determined a phase difference between the output current and the rectangular signal (claim 10), advances or delays the rectangular wave signal in response to the command signal according to the determined phase difference, and drives the switching devices (claim 11).

It would have been obvious to a person having ordinary skill in the art to modify the non-contact power supply of Nishino to include the measuring and storage units of Hayashi et al. One would have been motivated to include the measuring and storage units so that the command signal is corrected to prevent variations in the output voltage regulator to avoid cross current from flowing from one power supply to the other and therefore prevent breakage of circuit components (¶ 0004, lines 3-6, ¶ 0008, ¶ 0059, lines 5-7).

10. Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishino et al (US 5,709,291) in view of Hayashi et al (US Pub. No. 2002/0024828) and in further view of Shiyouichi (JP Pub. No. 11-206043).

Regarding claim 2, Nishino et al and Hayashi et al teach the non-contact power supply system as described above but fail to disclose a command signal transmitted from a power supply unit to the other power supply units.

Shiyouichi teaches the command signal (Figure 9, output of 9) for driving the switching devices (8a, 8b) is transmitted from a specific one of the power supply units (5) to the other supply units (6), and each of the power supply units advances or delays

the rectangular wave signal in response to the command signal having been received from the specific power supply unit, and drives the switching devices (¶ 0009).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the non-contact power supply system of Nishino et al and Hayashi et al by transmitting the command signal from one of the power supply units to the others. One would have been motivated to modify the non-contact power supply system as proposed to eliminate the phase difference between the power supplies, efficiently transfer power, and avoid overcurrent (Shiyouichi, ¶ 0008, 0009).

Regarding claim 5, Nishino et al and Hayashi et al discloses the non-contact power supply as described above, but fails to disclose a command unit.

Shiyouichi teaches the system further comprises a command unit (Shiyouichi: Figure 5, 28) for generating the command signal for driving the switching devices, the command signal being transmitted from the command unit to each of the power supply units, and the power supply unit advances or delays the rectangular wave signal in response to the command signal having been received from the command unit, and drives the switching devices (Shiyouichi: ¶ 0033, 0034).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the non-contact power supply system of Nishino et al and Hayashi et al by incorporating a command unit transmitting the command signal to each of the power supply units. One would have been motivated to modify the non-contact power supply system as proposed to eliminate the phase difference between the power supplies, efficiently transfer power, and avoid overcurrent (Shiyouichi, ¶ 0008, 0009).

11. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishino et al (US 5,709,291) and Hayashi et al (US Pub. No. 2002/0024828), and in further view of Premerlani (US 5,958,060).

Nishino et al and Hayashi et al teach the non-contact power supply system as described above but fail to disclose a command signal as a signal for compensating for a phase delay between subsequent power supply units.

Premerlani discloses a specific one of the power supply units and the other power supply units are connected in series via signal transmission lines (Figure 1, 416), the specific power supply unit transmits, to the downstream power supply unit, the command signal (column 2, line 11, “time stamp data”)as a signal for compensating for a phase delay between the specific power supply unit and the power supply unit connected downstream, the phase delay being caused by a length of the signal transmission line (column 1, lines 25-36), each of the other power supply units outputs the rectangular wave signal for correcting and driving the switching devices based on the command signal having been received from the power supply unit connected upstream (column 2, lines 10-14), and transmits, to the downstream power supply unit, the received command signal (column 2, lines 14-20) as a signal for compensating for a phase delay between the power supply unit and the power supply unit connected downstream, the phase delay being caused by a length of the signal transmission line (column 1, lines 25-36).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the non-contact power supply system of Nishino et al and

Hayashi et al to include a command signal as a signal for compensating for a phase delay between subsequent power supply units. One would have been motivated to incorporate such a command signal to have a power system with more efficient and accurate synchronization of clocks at remote locations (column 1, lines 25-36).

12. Claim 4 rejected under 35 U.S.C. 103(a) as being unpatentable over Nishino et al (US 5,709,291) in view of Hayashi et al (US Pub. No. 2002/0024828) and Shiyouichi (JP Pub. No. 11-206043), and in further view of Lentini et al. (US 4,886,981).

Nishino et al, Hayashi et al, and Shiyouichi teach the non-contact power supply system as described above but fail to disclose a backup command signal in each of the power supply units.

Lentini et al teaches each of the other power supply units forms a backup command signal (Figure 2, CKI) for matching phases of the received command signal and frequency (Column 5, lines 25-30), and when the command signal is not inputted, the power supply unit advances or delays the rectangular wave signal in response to the backup command signal and drives the switching devices (column 3, lines 10-22, 29-38).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the non-contact power supply system of Nishino et al, Hayashi et al, and Shiyouichi by providing backup command signals in each of the power supply units. One would have been motivated to incorporate such backup command signals to avoid centralized circuits which hinder the reliability of the power supply system (column 2, lines 48-49).

13. Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Nishino et al (US 5,709,291) in view of Hayashi et al (US Pub. No. 2002/0024828), and in further view of Kazutoshi (US 7,009,860).

Nishino et al and Hayashi et al teach the non-contact power supply system as described above, but fail to disclose a capacitor and variable inductor connected in series with the induction lines.

Kazutoshi discloses a capacitor and a variable inductor are connected in series with the induction lines, and the induction lines, capacitor, and variable inductor connected in series have an impedance of the predetermined frequency set as a capacitive reactance (column 1, lines 56-59).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the non-contact power supply of Nishino et al and Hayashi et al by providing a capacitor and variable inductor in series with the induction lines in order to suppress fluctuation of the current in the lines when the circuit load varies (column 1, lines 61-63).

14. Claim 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Nishino et al (US 5,709,291), Hayashi et al (US Pub. No. 2002/0024828), and Premerlani (US 5,958,060), and in further view of Lentini et al. (US 4,886,981).

Nishino et al, Hayashi et al, and Premerlani teach the non-contact power supply system as described above, but fail to disclose a backup command signal in each of the power supply units.

Lentini et al discloses each of the other power supply units forms a backup

command signal (Figure 2, CKI) for matching phases of the received command signal and frequency (Column 5, lines 25-30), and when the command signal is not inputted, the power supply unit advances or delays the rectangular wave signal in response to the backup command signal and drives the switching devices (column 3, lines 10-22, 29-38).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the non-contact power supply system of Nishino et al, Hayashi et al, and Premerlani by providing backup command signals in each of the power supply units to avoid centralized circuits which hinder the reliability of the power supply system (column 2, lines 48-49).

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sunden (US 7,117,383) and Saeki (US 2002/0048335) are cited to show a phase delay control system. Aoki (US 2005/0068009) is cited to show a non-contact power supply system utilizing a memory. Caruthers et al (US 6,466,469) and Caruthers et al (US 2004/0208029) are cited to show a master-slave arrangement of converters. Takasan et al (US 6,089,362) is cited to show a relevant non-contact power supply system. Boys et al (US 5,898,579) is cited to show a non-contact power distribution system controlling the resonant frequency.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANUEL HERNANDEZ whose telephone number is (571)270-7916. The examiner can normally be reached on 5/4/9 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seungsook Ham can be reached on 571-272-2405. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MH

/Michael H. Caley/
Primary Examiner